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For: EFFICIENT JOINT EQUALIZATION/DECODING METHOD
AND APPARATUS FOR COMPLEMENTARY-CODE-KEYING
BASED SYSTEMS

1 1. A Fast Walsh Transform bias cancellation system, comprising:
2 a bias generator system having a plurality of inputs responsive only to feedback
3 filter coefficients f_1 , f_3 , f_5 and f_7 , said bias generator generating, based upon said feedback
4 filter coefficients, a plurality of output signals corresponding to the bias from a Fast Walsh
5 Transform system for cancelling said bias.

1 2. The Fast Walsh Transform bias cancellation system of claim 1, further including a
2 feedback filter coefficient generator for generating feedback filter coefficients.

1 3. The Fast Walsh Transform bias cancellation system of claim 1, in which the bias
2 generator has a plurality of outputs each having a signal thereon, the bias generator output
3 signals being defined by the equation:

4
$$B_k = (-f_1\Phi_2 + f_3\Phi_2^*)a_{0,\lfloor k/4 \rfloor}b_{\lfloor k/4 \rfloor,k}^* + (2f_3\Phi_2 + 2f_5\Phi_2^*)b_{\lfloor k/4 \rfloor,k}^*$$

5
$$+ (-f_5\Phi_2 + f_7\Phi_2^*)a_{0,\lfloor k/4 \rfloor}b_{\lfloor k/4 \rfloor,k}^*$$

1 7. The Fast Walsh Transform bias cancellation system of claim 4, in which the first set
2 of complex multipliers includes three complex multipliers, the plurality of adders includes
3 eight adders, the second set of complex multipliers includes sixteen complex multipliers
4 and the bias generator includes sixteen outputs.

1 8. The Fast Walsh Transform bias cancellation system of claim 4, in which the bias
2 coefficient generator is responsive to the feedback filter coefficients consisting of f_1 , f_3 , f_5 ,
3 and f_7 .

1 9. The Fast Walsh Transform bias cancellation system of claim 4, in which the bias
2 coefficient generator is further responsive to a Fast Walsh Transform parameter that
3 indicates the quadriphase rotation.

1 10. The Fast Walsh Transform bias cancellation system of claim 9, further including the
2 Fast Walsh Transform system.

1 13. The Fast Walsh Transform bias cancellation system of claim 12, in which the
2 outputs of the bias generator has sixteen outputs each having a signal thereon, the bias
3 generator output signals being defined by the equation:

4
$$B_k = D_0 a_{0, \lfloor k/4 \rfloor} b_{\lfloor k/4 \rfloor, k}^* + D_1 b_{\lfloor k/4 \rfloor, k}^* + D_2 a_{0, \lfloor k/4 \rfloor} b_{\lfloor k/4 \rfloor, k}^*.$$

1 14. The Fast Walsh Transform bias cancellation system of claim 11, in which the first
2 set of complex multipliers includes three complex multipliers, the plurality of adders
3 includes eight adders, the second set of complex multipliers includes sixteen complex
4 multipliers and the bias generator includes sixteen outputs.

1 15. The Fast Walsh Transform bias cancellation system of claim 11, in which the bias
2 coefficient generator is responsive to the feedback filter coefficients consisting of $f_1, f_3, f_5,$
3 and f_7 .

1 16. The Fast Walsh Transform bias cancellation system of claim 11, in which the bias
2 coefficient generator is further responsive to a Fast Walsh Transform parameter selected
3 from the group of ϕ_2 selected from the group of 1, -1, j and -j.

1 17. The Fast Walsh Transform bias cancellation system of claim 11, further including
2 the Fast Walsh Transform system.

1 18. A Fast Walsh Transform bias cancellation system, comprising:
2 a Fast Walsh Transform system having a plurality of outputs;
3 means for generating the bias of the Fast Walsh Transform system;
4 means for cancelling the bias from said Fast Walsh Transform system responsive
5 to said Fast Walsh Transform system outputs and said means for generating the bias of a
6 Fast Walsh Transform system.

1 19. A method for cancelling the bias from a Fast Walsh Transform system, the
2 method comprising the steps of:
3 generating the bias from a Fast Walsh Transform system responsive only to
4 feedback filter coefficients f_1 , f_3 , f_5 and f_7 ; and
5 cancelling the bias of said Fast Walsh Transform system using the generated bias
6 of the Fast Walsh Transform system.